Bachelor Degree Project

UNIVERSITY OF SKÖVDE

ACADEMIC MOTIVATION AND WELL-BEING IN SWEDEN AND CHINA: An empirical study with a neuroscientific perspective.

Bachelor Degree Project in Cognitive Neuroscience
Basic level 22.5 ECTS
Spring term 2018

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Abstract

The Self-Determination Theory (SDT) claims that autonomous motivation is a basic psychological need for all humans across cultures. When this need is met, individuals are predicted to experience well-being. However, it has been argued that autonomous motivation is not a basic need in the Chinese culture due to their philosophical background. Furthermore, commonly used instruments to measure well-being have been criticised for not measuring low arousal positive affect such as "harmony" or "peace of mind" which have been argued to more accurately target well-being for the Chinese population. The aim of this thesis is to give an overview of the psychological and cognitive neuroscientific research relating to intrinsic and extrinsic motivation, well-being and the associated cultural controversy. Additionally, a questionnaire-based study is reported which examine motivation type and well-being of 183 university students in China and in Sweden through self-reported data. The results support the SDT by showing that intrinsic motivation is correlated to well-being for both samples. Furthermore, the Swedish students experienced higher well-being compared to the Chinese students measured by the traditional "western" instruments. However, the Swedish and the Chinese students reported very similar peace of mind. This indicates that the commonly used instruments might not target well-being accurately universally. Limitations of the study and directions of future research is suggested in the discussion.

Keywords: cognitive neuroscience, self-determination theory, well-being, subjective well-being, peace of mind, cultural differences

Acknowledgements

Firstly, I would like to express my gratitude to SIDA who made this project possible through the Minor Field Study scholarship. I also want to thank Judith Annett for supervising me through less than optimal conditions on Skype sessions across continents and time zones. I would also like to thank other staff at the University of Skövde who have supported me in to pursuing this project from the start, Frida Lindgren at the international office and Kristoffer Ekman, the program manager of the Cognitive Neuroscience and Applied Positive Psychology Program. Furthermore, I am very grateful for the help with the Chinese language and contacts in China which I have received form Dr. Jianguo Ding and Guanyu Liu. I would also like to thank Tian Ruan and Peng Yuqi for enabling me to contact participants of the study by acting as translators for me at their universities. Additionally, I want to thank my contact person Nemo (Dr. Rong Zhen), who has been supported me in the preparation phase in Skövde and showing me around in Shanghai. Above all, I want to thank my dear boyfriend Stephan Jacobs for the endless support through my time in university and the encouragement to do this project in China.

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1. Introduction

Within psychology, the Self-Determination-Theory (SDT) has laid the ground for a common understanding of motivation for the last four decades (Ryan & Deci, 2000; Di Domenico & Ryan, 2017). According to SDT people engage in school, work or other activities for two main reasons; extrinsic motivation (EM) which is the striving for rewards such as money or social acceptance, or intrinsic motivation (IM) which is the striving for the satisfying experience of engaging in a task (Ryan & Deci, 2000). IM has repeatedly been demonstrated to be associated with higher achievement and well-being whereas in contrast, EM is associated with maladaptive learning attitudes, decreased well-being and psychopathology (Ryan & Deci, 2000; Ryan, Deci, Grolnick, & La Guardia, 2006; Deci & Ryan, 2015). Paradoxically, a common way of trying to enhance motivation in educational settings or at workplaces today is by extrinsic rewards such as grades or monetary rewards. In this thesis, focus will be on how IM correlates with well-being and not the negative associations of EM. More recently, these psychological theories of intrinsic and extrinsic motivation have been crossing fields with cognitive neuroscience. This fusion is important since cognitive neuroscience has the potential to give a more objective perspective of the psychological theories that go beyond behavioural observations and self-reports allow a higher level of experimental methods (Di Domenico & Ryan, 2017). Cognitive neuroscientific studies aim to understand how something that is rewarding alters neural processes in the brain that have an impact on a person's motivated behaviour (Delagado, 2007). This thesis will give a brief review about the early science of the reward system which has formed the foundation for the more recent neuroscientific exploration of IM and EM and the so-called undermining effect between the both (Deci, 1971; Murayama, Matsumoto, Izuma, & Matsumoto, 2010). This research potentially has practical value for occupational as well as educational science. The focus of this thesis is on how IM correlates to well-being in

an educational setting.

A central hypothesis of SDT is that students who are driven by IM experience several positive consequences at school, including higher well-being (Ryan & Deci, 2000). However, it has been debated if IM is a predictor for well-being cross-culturally or if it is only valid in a "western" culture (Vansteenkiste, Lens, Soenens, & Luyckx, 2006; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

It has been argued that the "western" culture has philosophical roots from Socrates which demonstrated that tasks that are worth pursuing should be of personal relevance or interest (Hau & Ho, 2010). The Chinese culture, on the other hand, has philosophical roots from the Confucian tradition where, hierarchical relationships and teacher-directed learning is fundamental (Hau & Ho, 2010). Chinese students have been described as under high pressure from extrinsic sources such as parents, teachers and the society to perform well in academic settings (Jingbo & Elicker, 2005; Markus & Kitayama, 2003). In the opposite of SDT, it is argued that the Chinese scholars actually flourish from the external pressure (Markus & Kitayama, 2003). In order to verify the validity of SDT cross-culturally, multiple studies concerning IM in correlation to well-being have been conducted and indeed confirmed that IM correlates with well-being in different cultures such as USA, Russia (Chirkov & Ryan, 2001), China, Belgium, Peru (Chen et al., 2014) and Finland (Ketonen, Dietrich, Moeller, Salmela-Aro, & Lonka, 2018). As far as the author of this thesis is aware, no such study has been conducted on a Swedish sample of students yet.

Another debated cultural controversy is how to measure well-being cross-culturally. Some scientists have argued that the common instruments are not targeting well-being accurately universally (Lee, Lin, Huang, & Fredrickson, 2012). This is problematic for researchers, policy makers and governments around the world which recently have started to consider using measures of well-being research to monitor progress to the public policy

(Carlquist, Ulleberg, Delle Fave, Nafstad, & Blakar, 2016; Dolan & Metcalfe, 2012). Furthermore, The World Health Organization (WHO, 2013) have expressed a need for making the concept "well-being" clearer in order to get a valid and comparable result of well-being of people across the globe.

In "western" psychology, Ed Diener´s concept Subjective Well-Being (SWB) has been described as one of the most accurate ways of measuring well-being. The operational definition is that SWB is equal to the experience of a high degree of satisfaction over one´s life, a low level of negative affect (NA), and a high level of positive affect (PA) (Diener, 1984; Deci & Ryan, 2006; Ryan & Deci, 2001). The cognitive part which is an individual's subjective evaluation of the satisfaction of life has commonly been measured by the "satisfaction with life scale" (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The affective part of SWB has commonly been measured by the "positive affect negative affect schedule" (PANAS; Watson, Clark, & Tellegen, 1988). Together these scales are commonly used in combination to get a complete measure of a person's SWB in psychology research. However, this concept has met with some criticism for only targeting the "western" culture (Y. Lee et al., 2012). PANAS has been criticized for not covering the full spectrum of positive affect (PA) and completely leaving out low-arousal positive (LAP) affect such as "calm" and "peaceful" which are demonstrated to represent the most desired affect in the Chinese culture (Delle Fave et al., 2016; Lu & Gilmour, 2004; Tsai, Knutson, & Fung, 2006; Y. Lee et al., 2012). Because of this, the Peace of Mind Scale (POMS) was created in order to target LAP affect (Y. Lee et al., 2012).

More recently, just like the topic of motivation, well-being research have also been crossing fields with cognitive neuroscience. This research has the potential to track the connection between well-being and neuroanatomy (Hayward, Stokes, Taylor, Young, & Anderson, 2010). However, the majority of studies has examined well-being as the "western"

concept SWB (Rickard & Vella-Brodrick, 2013). To the authors knowledge, no neuroscientific study has so far been measuring well-being as "peace of mind" using POMS or similar scale. An additional branch of research that has emerged is called cultural neuroscience with the aim of understanding how sociocultural environment influence the human mind by looking at the neurobiology of people from different cultures (Zhou & Cacioppo, 2010; Kitayama & Park, 2010).

The aim of this thesis is to give an overview of the psychological and cognitive neuroscientific research relating to intrinsic and extrinsic motivation, well-being and the associated cultural controversies. Additionally, the aim is to conduct a field study to investigate differences and similarities in motivation type and well-being of university students in China and in Sweden through collection of self-report data. This will be done to analyse the cultural controversies regarding motivation and well-being research.

There is a number of general predictions in this study. Firstly, it is expected that Swedish participants will show higher IM than Chinese participants. Conversely, Chinese participants are expected to show higher EM than Swedish participants. Secondly, it is expected that Swedish participants will show higher IM than EM. Conversely, Chinese participants are expected to show higher EM than IM. Thirdly, it is predicted that, in general, well-being has a positive correlation with IM for both groups. Fourthly, it is expected that Chinese and Swedish participants might show a different pattern of responding on the two measures of affective well-being (PA and POMS). Specifically, it is predicted that PA of Chinese participants as measured by the PANAS would be lower than the Swedish participants, and that "peace of mind" of Chinese participants as measured by POMS would be higher than the Swedish participants. The empirical study will be presented including participants, measurements, procedure, statistical analysis and the results. A discussion will

follow with suggestions for future directions drawn from the present thesis. This will be followed by a conclusion.

2.Theoretical Background of motivation

2.1 Self-Determination Theory

Within psychology, the Self-Determination-Theory (SDT) has laid the ground for a common understanding of motivation for the last four decades (Ryan & Deci, 2000; Di Domenico & Ryan, 2017). SDT claims that there are three basic needs that are important for well-being of all humans, across cultures (Levesque, Zuehlke, Stanek, & Ryan, 2004). These basic needs are relatedness, competence and autonomy (Ryan & Deci, 2000). The need of relatedness refers to one´s need to feel socially connected, cared for and loved by other individuals (Ryan & Deci, 2000). Competence concerns the need to feel able to master life situations, while autonomy is defined as the need to feel psychologically free, to have choices and to have ownership of one´s actions (Ryan & Deci, 2000). The findings of numerous of studies have suggested that relatedness, competence and autonomy correlate with enhanced well-being and when prohibited correlate to diminished well-being (Ryan & Deci, 2000). The need of competence (Csikszentmihalyi, 1988) and especially relatedness (Baumeister & Leary, 1995) has been widely accepted as a basic psychological need across cultures and therefore not received much attention in studies (Levesque et al., 2004; Baumeister & Leary, 1995). However, whether autonomy is a basic need for all humans has been more controversial and therefore a growing field of cross-cultural studies of autonomy has emerged (Chirkov & Ryan, 2001; Iyengar & DeVoe, 2003; Levesque et al., 2004; Bao & Lam, 2008). This thesis is focusing on the most debated part of the SDT, the need for autonomy.

A person acting with autonomy is behaving in line with his or her own interest, the actions being regulated by the self. The opposite of autonomy is heteronomy which refers

to controlled regulation (Ryan & Deci, 2006). SDT states that there are two main types of motivations; intrinsic, which is an autonomous motivation that comes from the individual's pure interest for a task. Extrinsic, on the other hand, is a heteronomous motivation that can be divided into four subdivisions; external regulation, introjected regulation, identified regulation and integrated regulation. The four EM types all have in common that they are motivating for a consequence such as a reward or avoidance of punishment but vary in the degree of autonomy/heteronomy (Ryan et al., 2006). Ryan and Connell (1989) studied these motivation types and suggested they lie along a continuum of autonomy in an ordered correlation.

External regulation is the least autonomous and the most heteronomous EM type. When using education as the example, a student who is externally regulated is performing without any perceived relevance or interest for the task, the motivation comes only to please an external request, such as a parent or a teacher (Ryan & Deci, 2000). Introjected regulation is the second most heteronomous motivation type of EM which is relatively controlled by outer forces. The student understands the importance of studying but the causation is still external. Behaviours are performed to avoid anxiety, guilt or failure and to demonstrate ability (Ryan & Deci, 2000). Identified regulation is a more self-determined, or autonomous, form of EM which reflects that the action is accepted as personally important for the student (Ryan & Deci, 2000). Integrated regulation is the most autonomous version of EM (Ryan & Deci, 2000). The importance of studying is completely integrated to the students own autonomous values. Actions caused by integrated regulation share many similarities with IM but are considered to be an EM type since they are done to achieve an outcome rather than for the inherent enjoyment of the action (Ryan & Deci, 2000).

With the opposite of EM, people who are intrinsically motivated are doing an activity because they think it is inherently satisfying and interesting and not necessarily because it leads to an extrinsic reward such as high grades or a well-paid job (Ryan & Deci,

2000). Playful and explorative activities performed by children is characterized as intrinsically motivated (Kaplan, 2007). Other intrinsically motivated activities concerning all ages are singing, painting, hiking and puzzle-solving for example (Kaplan, 2007). Such activities are described as providing feelings of effortless control, losing the sense of time and interoception during total concentration and have also been described as being in *flow* (Csikszentmihalyi, 2008). Additionally, amotivation is the state of lack of intention to act. A person who is amotivated either acts without intent or does not act at all. Amotivation is the result of not valuing an activity, not expecting the activity to have a desired outcome, or not feeling competent to do the activity (Ryan & Deci, 2000).

2.2 Cognitive neuroscientific research of motivation

2.2.1 The reward system. Cognitive neuroscientific studies aim to understand how something that is rewarding alters neural processes in the brain that have an impact on a persons motivated behaviour (Delagado, 2007). The reward system refers to the structures in the brain where reward processes take place (Hidi, 2015). Olds and Milner (1954) stumbled upon the first clue to what is known as the reward system today by an accidental discovery. It was found that rats with implanted electrodes in the medial forebrain bundle would engage excessively in bar pressing to self-administer a brief electrical stimulation (Olds & Milner, 1954; Walter, Abler, Ciaramidaro, & Erk, 2005). The medial forebrain bundle is involved in the dopaminergic pathway which begins in the ventral tegmental and continues to the nucleus accumbens which is part of the ventral striatum (Walter et al., 2005; Gazzaniga, Ivry, & Mangun, 2016). The observations of the self-stimulating rat led to further research on dopamine release in humans and other animals and the early conclusion that dopamine was involved in the subjective pleasure that stems from the reward pathway (Gazzaniga et al., 2016). This conclusion has been changed by more recent findings which have suggested that

dopamine is not connected to pleasure per se but to the "wanting" of the pleasure (Berridge & Kringelbach, 2008). "Wanting" and "liking" are normally two outcomes of the same process, the rewarding stimulus being usually liked and wanted to the same degree (Robinson & Berridge, 2008). However, this has been found to not always be the case. In research on addiction, it is now commonly known that a strong motivation, a compulsive "wanting" for a drug does not necessarily lead to that an addict feeling the pleasure of "liking" the drug (Robinson & Berridge, 2008). Breiter et al. (1997) used a functional magnetic resonance imaging (fMRI) to study the reward circuit in the human brain in connection to addiction. Cocaine was injected to ten cocaine addicted participants who reported if they felt rush, high, low or craving time locked to the scanner. The striatum can be divided into two subsectors, the ventral and the dorsal striatum. Feelings of craving ("wanting") correlated to activity in the ventral striatum and feelings of rush ("liking") correlated to activity in the dorsal striatum (Breiter et al., 1997). The ventral striatum consists primarily of the nucleus accumbens and receives signals from orbitofrontal, ventrolateral and ventromedial cortex. In addition, the ventral striatum is associated with limbic areas such as the amygdala which are involved in emotional processing (Delagado, 2007). The dorsal striatum consists primarily of the caudate nucleus and the putamen and receives signals from dorsolateral prefrontal cortex (Delagado, 2007). Several studies of human and other animals have confirmed that the striatum is involved in the circuit responsible for motivated behaviour (Delagado, 2007).

This basic research on the reward system has provided grounds for more recent neuroimaging studies examining extrinsic reward, intrinsic reward and the so-called undermining effect between the both.

2.2.2 Cognitive neuroscience of extrinsic motivation. As noted earlier, EM has been described as the motivation to attain an external reward, such as money or social acceptance. In this section the neuroscientific research of extrinsic rewards will be reviewed.

In experimental studies, EM is usually operationalized as the temporary neural responses evoked by extrinsic rewards, such as money or food (Braver et al., 2014). Usually such a human neuroimaging study goes as follows: all of the participants are instructed to engage in a task while undergoing fMRI scanning. Some participants are instructed that they will receive a reward for good performance in the task and a control group do not get any instructions about a reward. This method is used to identify how the anticipated rewards changes activity in certain brain regions and then the images are compared to a control group (Braver et al., 2014). In a meta review about such neuroscientific studies, the amygdala, the nucleus accumbens (part of ventral striatum) and the orbitofrontal cortex were most commonly found to be involved in the human reward systems (Walter et al., 2005).

For example, Knutson, Fong, Adams, Varner, & Hommer (2001) performed this kind of study using a monetary reward for participants who engaged in a task. The study examined if the anticipation and the outcome of a reward would recruit different brain regions. One group of the participants responded to cued visual targets for monetary rewards, another group responded to the same targets for no reward and the control group did not respond to the cued targets. This study found that the nucleus accumbens was more activated with the anticipation, the "wanting", of the monetary reward and less activated when the reward was delivered, the "liking" of the reward. Furthermore, the nucleus accumbens had low activity when there was no anticipation for a reward (Knutson et al., 2001). A meta-analysis of more than 20 similar fMRI studies have confirmed that the nucleus accumbens are involved during the anticipation of monetary gains (Knutson & Greer, 2008).

To summarize, the neural correlates of extrinsic rewards have been associated with altered activation in several areas in the brain and especially in association with the ventral striatum. The ventral striatum has been connected to the "wanting" of an extrinsic reward and the dorsal striatum have been connected with the "liking" of an extrinsic reward.

How IM is neutrally represented, on the other hand, has been investigated more recently (Miura, Tanabe, Sasaki, Harada, & Sadato, 2017).

2.2.3 Cognitive neuroscience of intrinsic motivation. One of the first fMRI studies to examine if EM and IM have distinct neural bases was conducted in 2012 (Lee, Reeve, Xue, & Xiong, 2012). The ten undergraduate participants had their brains scanned while they decided to act for an intrinsic, extrinsic or neutral reason (W. Lee et al., 2012). Sixty familiar situations were presented to the participant on a screen and the participants answered yes/no if he or she wanted to engage in the situation such as "participating in a fun project", which is an intrinsic example. The intrinsically motivated decisions showed higher neural activity in the insular cortex which is hypothesised to be involved in emotional processing (Craig, 2009; W. Lee et al., 2012). Furthermore, insular cortex has been associated with feelings of pleasure generated by bodily sensations (Goldstein et al., 2009). Hence, the results were interpreted as the intrinsically motivated decisions being more determined by the self-satisfactions such as enjoyment and interest as the authors predicted (W. Lee et al., 2012).

Another fMRI study investigating the neural correlates of IM and found contradictory results (Marsden, Ma, Deci, Ryan, & Chiu, 2014). Participants were instructed to solve a fun word puzzle while their brains were scanned by the fMRI. After this, the participants could choose to spend the following 5 minutes by continuing with solving the puzzles, read the news, or simply wait for 5 minutes. Participants' intrinsic motivation was measured as the percentage of time they chose to spend on solving the puzzle during the free-choice period. The participants that spent at least 50 % of the free time on continuing with the puzzle were considered as the "intrinsically motivated group". The results showed that they exhibited significantly diminished neural responses in the amygdala, caudate, anterior cingulate cortex, parahippocampal gyrus and the insula (Marsden et al., 2014). These findings of diminished insular activity are the opposite of what W. Lee et al. (2012) reported.

Miura et al. (2017) also carried out an fMRI study to investigate the neural correlates of IM. In the experiment, 36 participants engaged in a stop-watch test while their brains were scanned (Miura et al., 2017). The participants were instructed to stop the stop-watch as close to a 3 second mark as possible. Directly after the fMRI scan, the participants were asked to engage in a free-choice experiment, which was to continue engage in the task for 10 minutes or take a break and just relax. It was concluded that the participants who decided to engage in the task experienced IM to do so. It was found that the midbrain regions and the ventral striatum showed significant altered activation when the participants engaged in the task with IM (Miura et al., 2017).

To summarize, cognitive neuroscientific research of IM is still scarce and has shown mixed results. IM has been associated with altered activation in the insular cortex while another study showed the opposite results, a significant decrease of activation in the insular cortex. Further brain areas with diminished activation in correlation to IM are the amygdala, caudate, anterior cingulate cortex and parahippocampal gyrus. In contrast, areas which have showed higher activation in correlation to IM are the midbrain regions and the ventral striatum which also been associated to motivation for extrinsic rewards. How these different motivation types influence each other will be reviewed next.

2.2.4 The undermining effect. A common way of trying to enhance motivation in educational settings or at workplaces today is by extrinsic rewards such as grades or monetary rewards. However, paradoxically, according to SDT these methods might actually undermine the IM which is theorised to predict good academic results and well-being. This phenomenon is usually referred to as the undermining effect and has been studied over four decades (Ryan & Deci, 2009). Prior to this research, the two motivation types were thought to work additively to each other, that pure interest for a task plus a monetary bonus will boost the motivation (Atkinson, 1964). Still today it is a common belief that people are likely to be

more motivated if there is an extrinsic reward system although repeated psychological experiments have revealed that extrinsic rewards can undermine people´s IM.

Deci, Koestner, & Ryan (1999) did a meta review of behavioural studies which have examined the undermining effect. Usually this phenomenon is studied by having two groups of participants engaged in a specific task, such as solving a puzzle, drawing or playing a word game with one group given a reward for participation and the other one not. Included in the experiment is a free-choice period after the task where the participants are free to do what they want where continuing to engage in the task is an option. IM for engaging in the task is measured by how much time the participant engaging in the task during the free-choice period. The undermining effect is deemed to have happened if the rewarded group spends less time engaging in the task during the free-choice period than the non-rewarded group. Additionally, it is common to have the participants fill in one or several self-report surveys measuring IM for the task to compare with the objective data (Deci et al., 1999). This kind of experimental design was applied by Deci (1971) in one of the first studies to distinguish that rewards can diminish IM. These results laid the ground for many more studies of the undermining effect.

For example, the undermining effect was examined in a fMRI study where students were instructed to play a reaction time game with a stop watch (Murayama et al., 2010). The students participated in two sessions, in session 1, half of the participants were told that they were getting a monetary reward if they made a somewhat accurate score in the game. The other half of the participants did not get any instructions about rewards at all. In session 1, both groups showed activation in the striatum when playing the game, however it was a higher activation for the rewarded group. As previously mentioned, striatum is an area in the brain which has shown altered activation when involved in rewards. In session 2, there was no introduction of rewards for any group. What is interesting is that the group who had

shown a higher activation in the striatum the first session had a remarkably low activation during the second session, when they no longer received an extrinsic reward. The other group, however, still had a high activation in the striatum for the second session, the game was still rewarding to play (Murayama et al., 2010). The results suggest that monetary rewards for good performance indeed undermine IM for the task, measured by the voluntary involvement in the task (Murayama et al., 2010). The authors argue that this experiment showed that the striatum has a central role for the undermining effect (Murayama et al., 2010).

To summarize, altered activation in the striatum have been associated with extrinsic rewards and intrinsic rewards. Studies of the undermining effect have showed that extrinsic rewards can diminish the IM to participate in a task in behaviour studies and in neuroscientific studies by decreased striatal activity. These studies potentially have practical value for occupational as well as educational science. As previously stated, the SDT proposes that people who are driven by IM are predicted to experience higher well-being than people who are driven by EM. Research on this topic will be reviewed further in this thesis, but first, the theoretical background of well-being will be presented.

3. Theoretical background of well-being

The concept "well-being" does not have one overarching definition. This is problematic for researchers as well as policy makers (Carlquist et al., 2016). According to Dolan and Metcalfe (2012) governments around the world have recently started to consider using measures of SWB research to monitor progress in public policy. Furthermore, the World Health Organization (WHO, 2013) have expressed a need for making the concept "well-being" clearer in order to optimize policymaking processes. In May 2013, the World health organization (WHO) created the Mental Health Action Plan 2013-2020 with the goal to promote mental well-being and prevent mental disorders across the globe. According to the

WHO the issue of mental health in the world has been overlooked for a long time and have therefore made this goal. The document has stated four objective global targets where one of them is "To strengthen information systems, evidence and research for mental health". This goal is defined as being reached when 80 % of the world's countries, routinely collect and report mental health indicators every two years through their national health and social information systems by the year 2020 (WHO, 2018). Hence, the goal is to systematically measure and report the well-being of people across the globe but in order to obtain an accurate result, a valid operational definition is needed that holds universally if that is possible. Next, the two major philosophical backgrounds that have laid the ground for most of the modern well-being research will be presented.

3.1 Hedonic well-being vs eudaimonic well-being

Well-being has been studied relatively intensively for the past quarter of the century (Deci & Ryan, 2006; Lambert, Passmore, & Holder, 2015). However, its origins can be traced back to the two major philosophical traditions of hedonia and eudaimonia (Lambert et al., 2015). "Hedonic well-being" is the philosophical point of view arguing that well-being is equal to happiness and based on pleasure attainment and pain avoidance (Ryan & Deci, 2001). "Eudaimonic well-being", on the other hand, emphasises that true well-being comes from a meaningful life, self-realization, and optimal functioning, not positive thoughts and feelings (Ryan & Deci, 2001). Aristotle considered the hedonic approach of well-being as a vulgar ideal which made humans slaves to chasing their desires (Ryan & Deci, 2001).

3.2 Subjective well-being

Ed Diener created the concept Subjective well-being (SWB) which has contributed a lot to the expansion of well-being research (Diener, 1984; Deci & Ryan, 2006; Seligman & Csikszentmihalyi, 2000). SWB has been described as one of the most accurate

ways of measuring well-being and the operational definition of SWB is most commonly interpreted as the experience of a low level of negative affect (NA), a high level of positive affect (PA), and a high degree of satisfaction over one´s life (Deci & Ryan, 2006; Ryan & Deci, 2001). SWB is associated with a hedonistic approach of well-being since it is based on affective pleasure and cognitive satisfaction (Ryan & Deci, 2001). Positive affect negative affect schedule (PANAS; Watson et al., 1988) is a common way to measure the affective part of SWB (Magyar-Moe, 2009; Y. Lee et al., 2012). The Satisfaction with Life Scale (SWLS) (Diener et al., 1985) is a common assessment to measure an individual's subjective evaluation of the satisfaction over life, hence the cognitive part of SWB. Together these scales have commonly been used in combination to get a complete measure of a person's SWB.

3.2.1 Cognitive neuroscientific research of subjective well-being. Within neuroscience the topic well-being is a relatively new field (Kringelbach & Berridge, 2009). Although constructs of well-being such as eudaimonic well-being have been examined, the majority of research of the neural correlates of well-being has examined hedonic well-being such as SWB with an emphasis on pleasure (Rickard & Vella-Brodrick, 2013). This research has the potential to track the connection between SWB and neuroanatomy (Hayward et al., 2010).

The first neuroscientific study which explicitly claimed to investigate well-being was conducted by Urry et al. (2004). In this study, eighty-four adults completed a self-report measure of hedonic well-being by PANAS and SWLS and eudaimonic well-being by the Psychological Well-Being Scale (SPWB) (Ryff, 1989) while being objectively measured by resting electroencephalography (EEG) (Urry et al., 2004). The results suggested that the experience of hedonic well-being (both affective and cognitive SWB) and eudaimonic well-being were associated with higher activation of the left pre-frontal cortex in comparison to the right pre-frontal cortex (Urry et al., 2004).

However, EEG has poor spatial resolution. Therefore, Kong, Hu, Wang, Song, & Liu (2015) conducted a study using a fMRI scanner in order to examine the more exact neural correlates of SWB, and especially the difference between the two components PA and life satisfaction. 294 healthy university students at Beijing Normal University had their brains scanned in an fMRI and were instructed to close their eyes, lie still, not to think about anything systematically and remain awake in order to analyse the neural activity in their resting state. Additionally, the participants reported their affective SWB by PANAS and their cognitive SWB with SWLS with the purpose of comparing SWB with spontaneous brain activity in healthy individuals. Cognitive well-being was correlated with altered activity in the bilateral posterior superior temporal gyrus (pSTG), right thalamus, right lingual gyrus, left planum temporale (PT), right posterior mid-cingulate cortex (pMCC) and left postcentral gyrus (PCG) gyrus. Kong et al. (2015) argue that previous studies have demonstrated that people with depression and schizophrenia have reduced spontaneous activity in the PCG and lingual gyrus. Hence, the authors suggest that altered activation in the several cortical and subcortical areas provides higher levels of cognitive functions such as self-control and it may facilitate a sense of cognitive well-being (Kong et al., 2015). In contrast, Affective well-being (high PA score and low NA score) was correlated with altered activation in the right amygdala. Kong et al. (2015) argue that previous studies have demonstrated that dysfunction in the amygdala is associated with several affective disorders, such as depression and anxiety. Thus, involvement of the amygdala might regulate affect which in turn might facilitate a sense of affective SWB.

In line with these findings, another study also suggested that the amygdala is connected to affective SWB (Cunningham & Kirkland, 2013). The participants of the study (N=42) were visually presented with pictures that represented positive, negative or neutral images while their brains were scanned by an fMRI. Afterwards, the participants reported on

a 1-4 scale if the pictures made them feel positive affect or negative affect. Additionally, the participants filled in the Subjective Happiness Scale (SHS) measuring cognitive SWB. Participant who had the highest "happiness score" showed greater amygdala reactions to the positive pictures and no significant reactions to the negative pictures. Since depression has been associated with increased amygdala activation to negative stimuli, the authors suggest that "happier" people have a more balanced amygdala and hence confirms that PA is associated with amygdala activation (Cunningham & Kirkland, 2013).

Another study with the aim of examining the neural correlates of SWB was conducted (Sato et al., 2015). The participants brains were scanned by a fMRI and grey matter volume of the various structures were analysed in correlation to self-reported SWB. Cognitive SWB was measured by a Japanese translation of the SHS and a Japanese translation of the Purpose in Life Test (Crumbaugh & Maholick, 1964). Affective SWB, PA and NA separately, was measured by a Japanese translation of the Emotional Intensity Scale (Bachorowski & Braaten, 1994). In contrast to the findings of Kong et al. (2015), Sato et al. (2015) found that both affective and cognitive SWB correlated with grey matter volume in the right precuneus. Sato et al. (2015) suggest that the precuneus facilitates SWB by integrating the emotional and cognitive components of SWB. These results are contradicting the suggestions of that affective and cognitive SWB is processed in distinct regions in the brains and furthermore, the two studies pointed at separate regions. Sato et al. (2015) discuss that the distinct findings could be due to the different methods used in studies.

Another study examined brain activity in two groups, one group that had scored very high (n=25) on subjective happiness (SHS) and one group that had scored very low (n=25) (Luo et al., 2014). The participants were instructed to rest with their eyes closed and to stay awake meanwhile their brains were scanned by a fRMI. The group which have scored low in subjective happiness showed significant decreased activation in prefrontal cortex,

limbic system, temporal lobe and certain subcortical regions. The authors argue that these observations suggest that mentioned brain regions are involved in cognitive SWB (Luo et al., 2014).

To summarize, both cognitive and affective SWB have been associated with higher activation of the left pre-frontal cortex in comparison than the right pre-frontal cortex (Urry et al., 2004). Further, a study suggested that the amygdala is connected to affective SWB (Cunningham & Kirkland, 2013). In line with these findings, another study showed results of correlations between affective SWB and altered activation in the right amygdala and that cognitive SWB correlated with altered activity in the bilateral pSTG, right thalamus, right lingual gyrus, left PT, right pMCC and left PCG (Kong et al., 2015). In contrast to the findings of Kong et al. (2015), Sato et al. (2015) found that both affective and cognitive SWB correlated with grey matter volume in the right precuneus.

Clearly, researcher have not come to coherent conclusions about the neural correlates of cognitive or affective SWB. However, it has been widely accepted to measure well-being as equal to SWB.

4. Theoretical background of cultural differences

4.1 Cultural differences of well-being

The concept Subjective Well-Being (SWB) has met criticism. It has been suggested that PANAS does not cover the full spectrum of PA but only covers moderate-arousal positive (MAP) affect such as “joyful”, “pleased” or “happy” and high-arousal positive (HAP) affect such as “enthusiastic”, “alert” and “excited”, not low-arousal positive (LAP) affect such as “calm” and “peaceful” (Y. Lee et al., 2012). Hence, high scores of MAP affect and HAP affect and low scores of NA indicate that an individual is emotionally well according to the commonly used “western” measurement PANAS (Y. Lee et al., 2012).

Studies comparing SWB scores in different cultures have shown that Asians and Asian American participants had lower affective SWB scores then the western participants (Diener, Suh, Smith, & Shao, 1995; Suh, 2002; Okazaki, 2000). It has been questioned if these scores are valid or are not accurately reflecting whether Asians have lower affective SWB (Y. Lee et al., 2012). Some scientists argue that people influenced by Chinese culture value affective SWB very differently from the hedonic approach to SWB which strives for high PA and low NA (Y. Lee et al., 2012; Markus & Kitayama, 1991; Lu, 2008). Lu and Gilmour (2004) suggested that cultural influences can shape peoples' subjective interpretation of well-being and hence influence peoples individual affective experience of well-being.

In one study, Chinese and European American participants responded to "what is happiness?" (Lu & Gilmour, 2004). It was found that the Chinese participants defined happiness/well-being as a harmonious homeostasis described commonly with "harmony", "balance" and "achieving positive evaluations of the self by others" (Lu & Gilmour, 2004). The European Americans, on the other hand, generally emphasised "feelings of being emotionally charged" in description of well-being/happiness (Lu & Gilmour, 2004).

In a study with similar topic, Tsai et al. (2006) investigated how culture influences how people want to feel. The authors found that Hong Kong Chinese and Asian Americans placed more value on PA with LAP affect such as "peaceful" and "calm" rather than the European Americans who value HAP affect such as "excitement" (Tsai et al., 2006). A similar pattern was found in a study with European American and Chinese children (Tsai, Louie, Chen, & Uchida, 2007).

Furthermore, lay peoples' definition of happiness was examined in 12 nations, Argentina, Brazil, Croatia, Hungary, India, Italy, Mexico, New Zealand, Norway, Portugal, South Africa, and United States in a study (Delle Fave et al., 2016). 2799 adults filled in a survey and reported their own definition of happiness where the answers referred both to

which domain they mostly associated to happiness (e.g. “Relations”, “Work”, “Health”, “Psychological definitions” etc.). The cross-culturally combined results showed that most people answered that happiness is mostly associated with the domain “Psychological definitions”. Within the psychological definitions, most people reported that “Harmony/balance” was the definition of happiness. The next most frequently answered domain was “Satisfaction” and the third was “Positive Emotions” (Delle Fave et al., 2016). The most frequent domain “Harmony/balance” included reported answers such as “inner peace”, “serenity” and “tranquillity” and categorized as LAP affects which was distinct from the reported HAP affects such as “joy” and “elation” which were categorized as “Positive Emotions”. The authors of the study agree with Y. Lee et al. (2012) that the connection between LAP affect and happiness/well-being needs further investigation in order to expand the definition of well-being theoretically and how it is measured (Delle Fave et al., 2016).

4.2 Cultural differences in academic motivation

A central hypothesis of SDT is that the more intrinsic motivation (IM) students have, the higher grades they have, the better they learn, the more they persist, and the higher well-being they experience (Guay, Ratelle, & Chanal, 2008; Ryan & Deci, 2009). However, whether autonomous motivation is important for students’ performance and well-being in the Chinese culture or not has been debated (Kember, 2000; Iyengar & DeVoe, 2003; Bao & Lam, 2008; Vansteenkiste et al., 2005). It has been argued that the “western” culture with philosophical roots from Socrates strives for individual success and self-actualization (Hau & Ho, 2010). “Western” peoples’ motivation for achievement is closely linked to self-worth and tasks that are worth pursuing should be of personal relevance or interest (Hau & Ho, 2010; Joshanloo, 2013). With this philosophical background, “western” cultures have formed their schools and leading theory about motivation in favour of the students’ autonomy (Ryan &

Deci, 2000; Hau & Ho, 2010). On the other hand, the Chinese culture has philosophical roots from the Confucian tradition where traditionally, achieving success involves fulfilling obligations for oneself but foremost to the society and the family (Lu, 2010; Hau & Ho, 2010; Joshanloo, 2013). Furthermore, hierarchical relationships and teacher-directed learning is fundamental within the Confucian tradition (Hau & Ho, 2010). With this philosophical background, the Chinese culture have formed their schools with less emphasis on the students' autonomy (Hau & Ho, 2010). Hence, it is argued that the lack of self-determination among Chinese students is not a problem (Hau & Ho, 2010). Markus and Kitayama (2003) agree that Chinese children do not seem to suffer from any negative consequences of the external pressure on them to achieve in school, it is argued that they actually flourish from it (Markus & Kitayama, 2003). This criticism has led to numerous studies on the topic which will be discussed next.

4.3 Cultural differences of academic motivation and subjective well-being

In order to verify the validity of SDT cross-culturally, multiple studies concerning intrinsic motivation (IM) correlated to well-being have been conducted in different cultures. The common way of how scientists have operationalized well-being is as subjective well-being (SWB) with emphasise on high cognitive evaluation of one's life, high positive affect and low negative affect. Chrikov and Ryan (2001) conducted a study to compare the need of autonomy and SWB for Russian (n=120) and American (n=116) students. They chose Russia since it is a nation which consistently have been associated with a high control, obedience and conformity of the people (Chirkov & Ryan, 2001). Both the American and the Russian students showed a positive correlation between life satisfaction measured by SWLS and IM measured by Self-Regulation Questionnaire-Academic Domain (SRQ-A; Ryan & Connell, 1989) (Chirkov & Ryan, 2001). A similar study investigating in

links between life satisfaction (SWLS) and students´ motivation (SRQ-A) on a German sample and an American sample (Levesque et al., 2004). The results showed that life satisfaction was positively correlated with IM in both cultures. Furthermore, Vansteenkiste et al. (2006) investigated in SWB and the basic need for autonomy in Chinese students. Data were gathered from a questionnaire about the experience of autonomy (e.g. "In my daily life, I frequently have to do what I am told") and SWB through SWLS and the PANAS. The results confirmed the SDT, experienced autonomy positively correlated with SWB for the Chinese students.

In a longitudinal study, Sheldon and Kasser (1998) found that the participants attaining extrinsic goals did not have a significant effect on enhanced SWB meanwhile the participants attaining intrinsic goals had a significant effect on enhanced SWB. which was among other scales, measured by SWLS and the PANAS. Furthermore, Sheldon and Kasser (1998) used the Depression Inventory (Radloff, 1977) and the Hopkins Symptom Checklist - Anxiety Subscale (Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) which are two self-report measures to examine signs of depression. These were conducted to be analysed in comparison to motivation type and well-being (Sheldon & Kasser, 1998). The data analysis revealed that intrinsic goals correlated with both affective SWB (high score PA, low score NA) and cognitive SWB (high score in SWLS) and negatively correlated to depression (Sheldon & Kasser, 1998). Because of the interactional and longitudinal design of the study the authors argue that it is unlikely that the results are caused by self-report biases or momentary state influences (Sheldon & Kasser, 1998).

Moreover, Howell, Chenot, Hill, and Howell (2009) designed a study to measure momentary SWB and the basic need satisfaction (BNS) which consists of autonomy, relatedness and competence (see page 9). 144 undergraduate students reported their SWB by the Subjective Happiness Scale (SHS) (Lyubomirsky & Lepper, 1999), Life Satisfaction

(SWLS) and Positive and Negative Affect (PANAS). Additionally, the participant reported their subjective evaluation of their BNS measured by a modification of the Basic Need Satisfaction in Life Scale (BNSLS) (Ilardi, Leone, Kasser, & Ryan, 1993). The authors found that the hour-by-hour ratings of increased SWB was correlated with increased autonomy (Howell et al., 2009).

A study of similar topic was made by Chen et al. (2014) measuring life satisfaction (SWLS) in correlation to BNS (BNSLS). This study investigated if the previously shown correlation between life satisfaction and BNS (Howell et al., 2009) would hold cross-culturally in one sample from China, Belgium, USA and Peru (total N=1051). The results showed that two out of the three components of BNS, namely autonomy and relatedness showed a significant correlation with life satisfaction when combining all of the participants reports (Chen et al., 2014).

Furthermore, Ketonen et al. (2018) studied IM and EM in correlation with affective SWB (PANAS) in Finnish university students (N=55). The aim of the study was to examine university students academic goal pursuit and their affective well-being. This was measured in a 2-week longitudinal study where the participants filled in a questionnaire on their smartphone several times per day. The results showed that IM goals correlated with PA, whereas EM goals correlated with NA (Ketonen et al., 2018).

To summarize, although it has been criticised, SDT still retains the idea that autonomy is a basic psychological need cross-culturally since numerous studies have showed that individuals acting from IM experience higher well-being (Ryan & Deci, 2000; Deci & Ryan, 2015).

4.4 Cultural neuroscience

A new way of understanding how sociocultural environment influence the human mind is by looking at the neurobiology of people from different cultures. This has been to referred to as cultural neuroscience (Zhou & Cacioppo, 2010; Kitayama & Park, 2010). One topic that has been studied is if people from different cultures which have different perspectives of identity show functional differences in the brain (Zhu, Zhang, Fan, & Han, 2007). In a study on this topic a group of Chinese participants and a group of "Western" participants were instructed to think about themselves while their brains were scanned by an fMRI. As predicted from previous neurobiological studies of self-representation, the medial prefrontal cortex (mPFC) was highly activated when the participants from both groups pursued this task. Following, the participants were instructed to think about their mother. For the Chinese participants the mPFC was also highly activated during this task but not for the "Western" participants. It was argued that these diversities were due to the cultural perspective of the self as one in the collective or the self as an independent agent. Zhu et al. (2007) suggest that these findings indicate that culture shapes the functional neurobiology of self-representation. To the best knowledge of the author, no cultural neuroscientific study regarding motivation type or well-being have been conducted yet.

4.5 Rationale for study

The current study will compare the motivation type and well-being of a sample of university students from Sweden and China through collection of self-report data. This type of comparison has not been reported before with these two populations to the best knowledge of the author. The aim of this comparison is to investigate if there are significant differences of motivation type and well-being in the samples and how they are correlated.

There were a number of general predictions. Firstly, it was expected that

Swedish participants would show higher IM than Chinese participants. Conversely, Chinese participants were expected to show higher EM than Swedish participants. Secondly, it was expected that Swedish participants would show higher IM than EM. Conversely, Chinese participants were expected to show higher EM than IM. Thirdly, it was predicted that, in general, well-being would have a positive correlation with IM for both groups. Fourthly, it was expected that Chinese and Swedish participants might show a different pattern of responding on the two measures of affective well-being (PA and POMS). Specifically, it was predicted that PA of Chinese participants as measured by the PANAS would be lower than the Swedish participants, and that "peace of mind" of Chinese participants as measured by POMS would be higher than the Swedish participants.

5. Method

5.1 Design

The current study was conducted by a third-year student of the Cognitive Neuroscience program at the University of Skövde as part of the final bachelor thesis in the spring of 2018. The study is designed to examine between group differences among two distinct groups of participants, a Swedish sample (n=93) and a Chinese sample (n=90). The study was questionnaire based and the variables measures intrinsic motivation, extrinsic motivation, amotivation, positive affect, negative affect, life satisfaction and peace of mind.

5.2 Participants

A total of (N= 183) university students participated in the study. The Swedish sample (n=93, mean age =25,8) included 55 females and 37 males. All the Swedish participants were students of the university of Skövde, Sweden. The Chinese sample (n=90, mean age=23,6) included 42 females and 48 males. The Chinese participants were students at East China Normal University, Tongji University and University of Shanghai for Science and

Technology. The participants were recruited by personal contact at their university by the author. Participation was voluntarily and anonymous. Participation was restricted to those of 18+ years and registered at a university in China or in Sweden. Further demographic questions were asked to indicate gender, age and field of education. No compensation was offered for participation. One potential participant was rejected for being Vietnamese and one participant was rejected for having already graduated and thus no longer a student.

5.3 Measurements

All the measurements were translated to Swedish for the Swedish participants, by a bilingual Swedish-English speaker into Swedish and translated back to English by another bilingual Swedish-English individual. For the Chinese participants, the measurements were translated by a bilingual Chinese-English speaker into Chinese and translated back to English by another bilingual Chinese-English person. The English/Chinese version of the measurements are attached in the Appendix.

5.3.1 Academic motivation scale college version (AMS-C). AMS-C was used as a measurement of the participants´ academic motivation. AMS is one of the most repeatedly used assessments to measure different motivation types of students and the AMS-C is an extension aimed at targeting a college population (Tóth-Király et al., 2017). In the present study the word “college” was replaced by “university” to avoid confusion. Originally the assessment was created in French (Vallerand, Blais, Brière, & Pelletier, 1989) and later on translated in to English (Vallerand et al., 1992). AMS-C measures three types of IM (knowledge, accomplishment and stimulation) and three types of EM (identified, introjected and external) and amotivation on a 7-point Likert scale (Vallerand et al., 1992). Originally, the 7-point Likert scale did not have one described value per number (7 numbers, 5 described values). In order to make it clearer for the participants in this study one descriptive value per

number was created (see appendix). The AMS has shown high levels of internal consistency with a mean alpha value of .81 (Vallerand et al., 1992).

5.3.2 Satisfaction with life scale (SWLS). SWLS was used to measure cognitive well-being. SWLS is an instrument to measure an over-all life satisfaction. SWLS consists of five statements (e.g. *"In most ways my life is close to my ideal*") which the participants were asked to answer by a 7-point Likert scale ranging from 1=strongly disagree, to 7=strongly agree (Diener et al., 1985). The internal consistency of SWLS is reported to be very good with an alpha of 0.87 and a great test-retest reliability correlation of 0.82 over a two-month time frame (Diener et al., 1985). SWLS has previously been used in studies with Chinese adolescents and has shown support for the psychometric properties of the scale in three different studies with Cronbach´s alpha of .85, .87 and .87 (Shek & Liu, 2013).

5.3.3 Positive affect negative affect schedule (PANAS). PANAS was used to measure affective well-being. The participants´ positive affect (PA) and negative affect (NA) were measured on independent dimensions (Watson et al., 1988). The PANAS is a 20-item measure consisting of two subscales, one measuring 10 items of PA (e.g., attentive, active, alert,) and the other one measuring 10 items of NA (e.g., afraid, distressed, ashamed) (Watson et al., 1988). The participants were instructed to respond how they felt during the latest week on a 5-point Likert scale ranging from *1=very slightly or not at all* to *5=extremely*. In community and college samples the PANAS has showed a high reliability and good psychometric properties (Watson et al., 1988). PANAS has shown a good internal consistency reliability, with alphas varying from 0.84 to 0.87 for NA and from 0.86 to 0.90 for PA (Watson et al., 1988).

5.3.4 Peace of Mind Scale (POMS). POMS was used to measure affective well-being. POMS has been developed to measure the LAP affect; peace of mind (Y. Lee et

al., 2012). The concept of peace of mind is defined to the extent one experiences harmony and inner peace. This assessment measures peace of mind through 7 sentence items and the participants were asked to answer how often they experienced the stated item in their daily life on a Likert scale ranging from *1= not at all* to *5= all the time* (Y. Lee et al., 2012). POMS was used as a complement to PANAS to measure affective well-being. Individuals from the Chinese culture have in previous studies scored higher than individuals from "western" cultures on this scale (Y. Lee et al., 2012). The alpha reliability coefficient of the POMS has been reported as .91(Y. Lee et al., 2012).

5.4 Procedure

All the participants filled in the self-reported measurements by hand with a pen on paper. All the participants were recruited at their university and asked personally by the researcher to participate. This procedure was adopted in order for the researcher to make sure that the participants were meeting the demographic criteria and that the participants could ask questions. Birnbaum (2004) presented criticism towards web-based surveys in a review article, arguing that it could likely target a biased sample who have access to a computer and actively chose to participate in the study without being asked personally. Chinese participants were provided with the survey in Chinese with an additional English translation. Swedish students were provided with the survey translated into Swedish. The participants were informed that the survey was targeting university students and asking questions about their academic motivation and well-being and would require around 10 minutes to complete. Before participation, all the participants read and signed an informed consent. The data from the Swedish sample were collected between 30th of January and the 5th of February 2018 and the data from the Chinese sample were collected between the 9th and the 14th of March 2018.

5.5 Statistical Analysis

The data were analysed using IMB SPSS Statistics Version 25 software. The cultural background of Sweden or China was a between group independent variable. Well-being (PANAS, SWLS and POMS) and motivation type (AMS-C) were the dependent variables. Spearman´s Rank-Order correlation was used to measure the correlations between variables. Since the data were not normally distributed, a Mann-Whitney U test was used for analysing data between the groups. The Wilcoxon Signed Rank test was used to compare data within the groups.

5.6 Results

5.6.1 Raw data. The responses on the POMS were scored as a total sum of all responses with Question 5 and 7 reverse scored. Since the other measurements, SWLS, PANAS and AMS-C had at least one participant who did not complete all questions the mean score was calculated, where appropriate, based on the number of actual items completed. As this was an exploratory study, no correction for multiple testing was used.

5.6.2 Academic motivation. Descriptive and inferential statistics of academic motivation scores for both the Swedish and Chinese samples are presented in Table 1. Additionally, the scores are illustrated in Figure 1. Results are given for total intrinsic motivation (IM) and total extrinsic motivation (EM) plus the 3 subscales of IM; (IMK: Knowledge, IMA: Accomplishment, IMS: Stimulation) and 3 subscales of EM; EMID: Identified, EMIN: Introjected, EME: External).

The subcomponents of IM showed following results. A significant (p=.002) greater median score of Intrinsic Motivation for Knowledge (IMK) was obtained for the Swedish sample (Mdn=6.0) compared to the Chinese sample (Mdn=5.3). A significant (p=.000) greater median score of Intrinsic Motivation for Accomplishment (IMA) was

obtained for the Chinese sample (*Mdn*=5.0) compared to the Swedish sample (*Mdn*=4.3)

For total EM, the Chinese sample had a significant (*p*=.000) higher median (*Mdn*=5.3) than the Swedish sample (*Mdn*=4.3). The subcomponents of EM showed following results. A significant (*p*=.034) greater median score of Extrinsic Motivation Identified (EMID) was obtained for the Chinese sample (*Mdn*=5.8) compared to the Swedish sample (*Mdn*=5.5). A significant (*p*=.002) greater median score of Extrinsic Motivation Introjected (EMIN) was obtained for the Chinese sample (*Mdn*=4.5) compared to the Swedish sample (*Mdn*=3.8). A significant (*p*=.000) greater median score of Extrinsic Motivation External (EME) was obtained for the Chinese sample (*Mdn*=5.5) compared to the Swedish sample (*Mdn*=3.8).

Table 1.

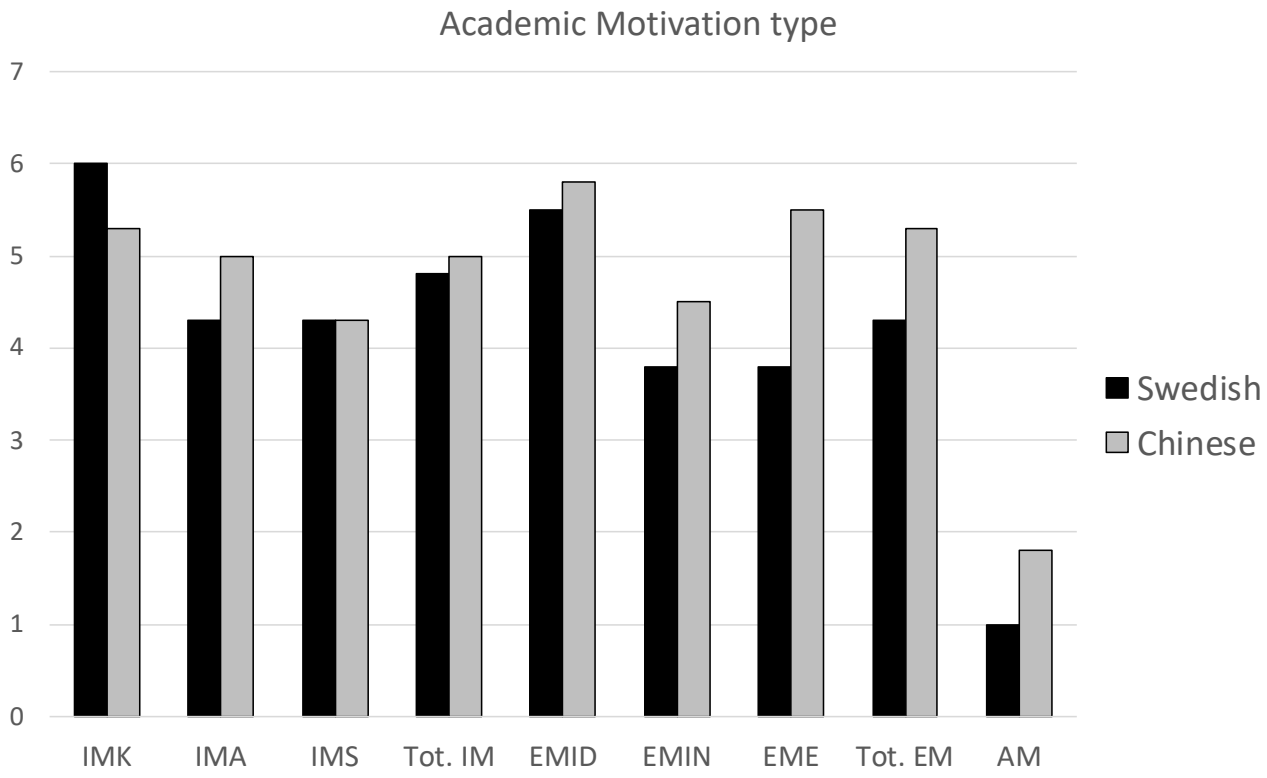
Mann-Whitney U differences between groups for Academic Motivation

	Total	Swedish	Swedish	Swedish	Chinese	Chinese	Chinese	
	N	*n*	*Median*	*Range*	*n*	*Median*	*Range*	*P-value*
IMK	182	93	6.0	6.0	89	5.3	4.3	.002
IMA	182	93	4.3	5.5	89	5.0	4.5	.000
IMS	182	93	4.3	6.0	89	4.3	5.5	.120
Tot. IM	182	93	4.8	5.3	89	5.0	4.6	.247
EMID	182	93	5.5	5.8	89	5.8	4.3	.034
EMIN	182	93	3.8	6.0	89	4.5	5.5	.002
EME	182	93	3.8	6.0	89	5.5	5.0	.000

Tot. EM	182	93	4.3	5.1	89	5.3	4.6	.000
AM	182	93	1.0	5.8	89	1.8	4.8	.000

IMK=Intrinsic Motivation Knowledge (AMS-C); IMA=Intrinsic Motivation Accomplishment (AMS-C); IMS=Intrinsic Motivation Stimulation (AMS-C); Tot. IM= Average of IMK, IMA, IMS; EMID=Extrinsic Motivation Identified (AMS-C); EMIN=Extrinsic Motivation Introjected (AMS-C); EM-E=Extrinsic Motivation External (AMS-C); Tot. EM= Average of EMID, EMIN, EME; AM=A-motivation (AMS-C)

Figure 1.



Descriptive and inferential statistics of within group differences of total average item score IM and EM on the AMS-C are presented in Table 2. In relation to the second hypothesis, the Swedish sample had a significantly higher average item score for IM (*Median* = 4.83) compared to EM (*Median* = 4.30) (p = .018). Conversely, the Chinese sample had a significantly higher average item score for EM (*Median* = 5.36) compared to IM (*Median* = 5.00) (p = .000).

Table 2.

Wilcoxon Signed Rank differences within groups for total average item score of Intrinsic motivation and Extrinsic motivation

Measures		Intrinsic Motivation			Extrinsic Motivation		
	n	Median	Range	n	Median	Range	P-value
Swedish	93	4.83	5.3	93	4.30	4.63	.018
Chinese	89	5.00	5.1	89	5.36	4.57	.000

Intrinsic Motivation= Average of IMK, IMA and IMS (AMS-C); Extrinsic Motivation= Average of EMID, EMIN and EME (AMS-C)

5.6.3 Correlations for the Swedish sample. In Table 3 Spearman´s rho correlations of PANAS, SWLS, POMS and AMS-C for the Swedish sample are presented. In relation to the third hypothesis, significant positive correlations between total IM and PA (*rho*=.483 *p* <.01) and SWLS (*rho*=.226 *p* <.05) was obtained. The subcomponents of IM showed following correlations. Significant positive correlations between IMK and PA (*rho*=.459 *p* <.01), SWLS (*rho*=.261 *p* <.05), and POMS (*rho*=.234 *p* <.05) was obtained. On the other hand, a significant negative correlation between IMK and NA (*rho*=-.282 *p* <.01) was obtained. Significant positive correlations between IMA and PA (*rho*=.329 *p* <.01), SWLS (*rho*=.239 *p* <.05), and POMS (*rho*=.231 *p* <.05) was obtained. Furthermore, a significant positive correlation between IMS and PA (*rho*=.485 *p* <.01) was obtained. Additionally, significant positive correlations between EMID and PA (*rho* =.236 *p* <.05) and SWLS (*rho*=.215 *p* <.05) was obtained. On the other hand, a significant positive correlation between Amotivation (AM) and NA (*rho*=.361 *p* <.01) was obtained. In contrast, significant negative correlations between AM and PA (*rho*=-.249 *p* <.05) SWLS (*rho*=-.450 *p* <.01) and POMS (*rho*=-.400 *p* <.01) was obtained.

Table 3.

Spearman´s rho correlations for Swedish sample (n=93) of PANAS, SWLS, POMS, AMS-C

	13	12	11	10	9	8	7	6	5	4	3	2
1 NA	.361**	.050	.101	.137	-.190	-.174	-.140	-.081	-.282**	-.603**	-.556**	-.355**
2 PA	-.249*	.064	-.043	-.051	.236*	.483**	.485**	.329**	.459**	.442**	.485**	
2 SWLS	-.450**	.024	-.052	-.072	.215*	.226*	.141	.239*	.261*	.583**		
4 POMS	-.400**	.028	-.015	-.095	.207	.212	.179	.231*	.234*			
5 IMK	-.308**	.091	-.178	.081	.301**	.845**	.774**	.515**				
6 IMA	-.052	.491**	.123	.612**	.265*	.834**	.632**					
7 IMS	-.138	.193	-.120	.226*	.261*	.921**						
8 Tot IM	-.172	.323**	-.042	.378**	.309**							
9 EMID	-.244*	.550**	.293**	.203								
10 EMIN	.145	.814**	.471**									
11 EME	-.009	.802**										
12 Tot EM	-.034											
13 AM												

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

PA=Positive Affect (PANAS); NA=Negative Affect (PANAS); SWLS=Satisfaction With Life Scale; POMS=Peace Of Mind Scale; IMK=Intrinsic Motivation Knowledge (AMS-C); IMA=Intrinsic Motivation Accomplishment (AMS-C); IMS=Intrinsic Motivation Stimulation (AMS-C); Tot IM= Average of IMK, IMA, IMS (AMS-C); EM-ID=Extrinsic Motivation Identified (AMS-C); EMIN=Extrinsic Motivation Introjected (AMS-C); EME=Extrinsic Motivation External (AMS-C); Tot EM= Average of EMID, EMIN, EME (AMS-C); AM=A-motivation (AMS-C)

5.6.4 Correlations for the Chinese sample. In Table 4 Spearman´s rho correlations of PANAS, SWLS, POMS and AMS-C for the Chinese sample are presented. In relation to the third hypothesis, a positive correlation between total IM and PA (*rho*=.437 *p* <.01) was obtained. The subcomponents of IM showed following correlations. Significant positive correlations between IMK and PA (*rho*=.375 *p* <.01), SWLS (*rho*=.217 *p* <.05), and

POMS (*rho*=.211 p <.05) was obtained. Furthermore, a significant positive correlation between IMA and PA (*rho*=.454 p <.01) was obtained. Additionally, IMS had a significant positive correlation with PA (*rho*=.355 p <.01). Furthermore, EMID had a significant positive correlation with PA (*rho*=.396 p <.01) and POMS (*rho*=.217 p <.05). On the other hand, AM had a significant positive correlation with NA (*rho*=.212 p <.05).

Table 4.

Spearman´s rho correlations for Chinese sample (n=93) of PANAS, SWLS, POMS, AMS-C

	13	12	11	10	9	8	7	6	5	4	3	2
1 NA	.212*	.048	.105	.172	-.191	-.039	-.041	-.054	.012	-.364**	-.427**	-.285**
2 PA	-.193	.256*	.114	.201	.396**	.437**	.355**	.454**	.375**	.369**	.361**	
2 SWLS	-.101	-.007	-.063	-.060	.153	.186	.118	.176	.217*	.666**		
4 POMS	-.114	.010	-.075	-.071	.217*	.168	.139	.169	.211*			
5 IMK	-.112	.525**	.294**	.462**	.625**	.886**	.680**	.742**				
6 IMA	-.260*	.681**	.395**	.643**	.695**	.905**	.679**					
7 IMS	-.076	.515**	.264*	.520**	.532**	.877**						
8 Tot IM	-.176	.645**	.357**	.597**	.701**							
9 EMID	-.322**	.755**	.569**	.438**								
10 EMIN	.013	.857**	.610**									
11 EME	-.135	.854**										
12 Tot EM	-.164											
13 AM												

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

PA=Positive Affect (PANAS); NA=Negative Affect (PANAS); SWLS=Satisfaction With Life Scale; POMS=Peace Of Mind Scale; IMK=Intrinsic Motivation Knowledge (AMS-C); IMA=Intrinsic Motivation Accomplishment (AMS-C); IMS=Intrinsic Motivation Stimulation (AMS-C); Tot IM= Average of IMK, IMA, IMS (AMS-C); EM-ID=Extrinsic Motivation Identified (AMS-C); EMIN=Extrinsic Motivation Introjected

(AMS-C); EME=Extrinsic Motivation External (AMS-C); Tot EM= Average of EMID, EMIN, EME (AMS-C); AM=A-motivation (AMS-C)

5.6.5 Well-being. Descriptive and inferential statistics for total scores for well-being between the Swedish and Chinese sample are presented in Table 5. Additionally, the scores are illustrated in Figure 2. In order to compare the scores graphically the scores are expressed in relation towards the maximum score possible within the scale in Figure 2. The number are therefore expressed in percentage of the maximum score of the corresponding test.

In relation to the fourth hypothesis, a significant (p=.000) greater median score of life satisfaction (SWLS) was obtained for the Swedish sample (Mdn=5.0) compared to the Chinese sample (Mdn=3.6). The Swedish sample obtained a median score of peace of mind (POMS) of (Mdn=23.0) and the Chinese sample obtained (Mdn=24.0) which are not significantly different (p=.999). The Swedish sample obtained a median score of positive affect (PA) (Mdn=3.4) and the Chinese sample obtained (Mdn=2.1), a difference which is not significant (p=.446). The Chinese sample obtained a median score (Mdn=3.0) of negative affect (NA) which is significantly (p=.000) higher than the Swedish median score (Mdn=1.9).

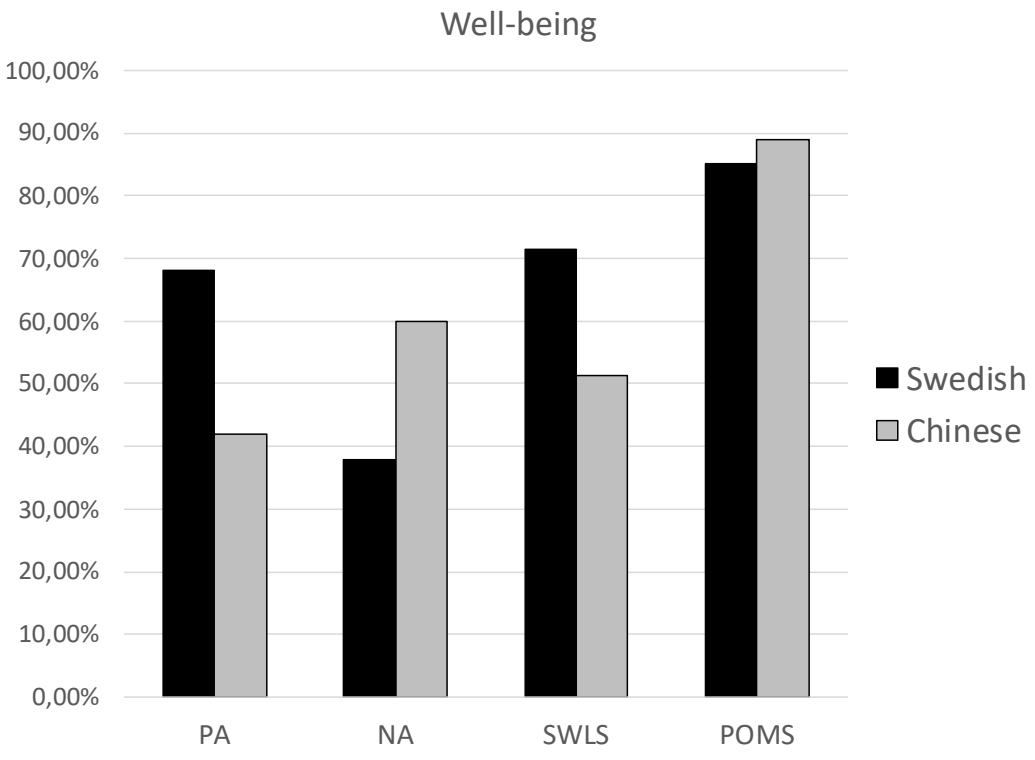
Table 5.

Mann-Whitney U differences between groups for Well-Being

Measure	Total	Swedish	Swedish	Swedish	Chinese	Chinese	Chinese	
	N	*n*	*Median*	*Range*	*n*	*Median*	*Range*	*P-value*
PA	181	91	3.4	3.2	90	2.1	3.9	0.446
NA	181	91	1.9	3.7	90	3.0	3.6	0.000
SWLS	181	91	5.0	5.6	90	3.6	5.6	0.000
POMS	168	81	23.0	23.0	87	24.0	21.0	0.999

PA= Positive Affect (PANAS); NA= Negative Affect (PANAS); SWLS= life satisfaction; POMS= peace of mind

Figure 2.



6. Discussion

The aim of this thesis was to give an overview of the psychological and cognitive neuroscientific research relating to intrinsic and extrinsic motivation, well-being and the associated cultural controversies. Additionally, the aim was to conduct a field study to investigate differences and similarities in motivation type and well-being of university students in China and in Sweden through collection of self-report data. This was done to analyse the cultural controversies regarding motivation and well-being research in comparison to the empirical findings of this empirical study which will be done in this discussion.

In relation to the first hypothesis**,** it was expected that the Swedish sample would show higher intrinsic motivation (IM) than the Chinese sample. Conversely, the Chinese sample were expected to show higher extrinsic motivation (EM) than the Swedish sample. This hypothesis was only partly confirmed since the results showed the following pattern. The Swedish sample had a significantly higher score of IM for learning new knowledge (IMK) compared to the Chinese sample, which is in line with the first hypothesis. In contrast, a significantly greater score of IM toward accomplishment (IMA) was obtained for the Chinese sample compared to the Swedish sample which is contradicting the first hypothesis. The first hypothesis also expected that the Chinese sample would show higher EM than the Swedish sample. In contrast of the mixed result for IM, the Chinese sample had a significantly higher score of all the subcomponents and total score of EM compared to the Swedish sample. These subcomponents consist of EM toward an action the student identified as personally important but not for the inherent joy of it (EMID), EM which is introjected in to the student (e.g. to perform to avoid guilt or failure and to demonstrate ability) (EMIN), and EM which is entirely to please an external request such as a parent or the society (EME). This part of the hypothesis was confirmed and is showing that the participants from the

Chinese culture experience extrinsic motivation to a greater extent than the Swedish participants. This could be due to the philosophical background of Confucianism in China with less emphasis on autonomous expression (Hau & Ho, 2010; Joshanloo, 2013). Furthermore, it was expected that the Swedish sample would show higher intrinsic motivation than the Chinese sample, which it did for one subcomponent. This hypothesis was based on argues that "western" societies are formed by philosophical roots from Socrates with high emphasis on autonomous expression (Hau & Ho, 2010; Joshanloo, 2013). Psychological literature frequently uses the terms "east" and "west" in order to make a distinction between two cultures. Sometimes "west" refers to the northern American population, sometimes it involves western Europe and sometimes it is not declared at all what it means (Markus & Kitayama, 1991; Salili & Lai, 2003; Lu, 2008). In this study the Swedish participants were assumed to represent a "western" sample although it is highly unclear if previous literature would include Sweden as a "western" culture. After all, the Nordic region is often regarded as being somewhat differ to other regions in Europe and America, for example. This could have been the reason why the results for intrinsic motivation had a more mixed pattern. This oversimplified distinction of "western" and "eastern" cultures is problematic since the results are difficult to interpret and replicate.

In relation to the second hypothesis, it was expected that Swedish participants would show higher intrinsic motivation (IM) than extrinsic motivation (EM) when looking at within group differences. Conversely, Chinese participants were expected to show higher EM than IM**.** The results showed that the Swedish sample had a significantly higher IM than EM. On the opposite, the Chinese sample had a significantly higher EM than IM. These findings confirm the second hypothesis and support the previous demonstrations, that people from the Chinese culture and the "western" culture are mainly driven by distinct motivation types (Hau & Ho, 2010; Joshanloo, 2013). However, it has been argued that people from the Chinese

culture should not experience a diminished score of well-being when driven by EM, but actually experience higher well-being in correlation with EM (Markus & Kitayama, 2003; Hau & Ho, 2010; Joshanloo, 2013). On the opposite, the self-determination theory (SDT) claims that all people experience higher well-being in correlation to IM and diminished well-being in correlation to EM and have been strengthening these claims with numerous of studies with results in favour (Ryan & Deci, 2000; Chirkov & Ryan, 2001; Chen et al., 2014; Ketonen et al., 2018). This leads to the next hypothesis.

In relation to the third hypothesis, it was predicted that in general, well-being would have a positive correlation with intrinsic motivation (IM) for both groups. The results from both the Swedish and Chinese samples had significant positive correlations between IM and measures of well-being which confirms the hypothesis. Furthermore, both samples had significant positive correlations between the measures of well-being and EMID, which is a more autonomous kind of extrinsic motivation where the student identify an action as personally important but not for the inherent joy of it. These results were not completely surprising since previous studies have been showing that the different motivation types vary in level of autonomy/heteronomy and lay on a continuum rather than being two completely distinct types (Ryan & Connell, 1989; Ryan et al., 2006). Furthermore, amotivation (AM), which is no motivation at all was used as a control for this test. AM had a significant positive correlation with negative affect (NA) in both samples, which was expected. Further, AM had significantly negative correlations of all measures of well-being for the Swedish sample. Why this outstanding negative correlation between no academic motivation and well-being for the Swedish sample occurred is unknown. In general, Swedish students have received little attention in studies of motivation and well-being and these significant correlations might be worth to look into further in future research. It should be taken into consideration that although well-being was significantly correlated to IM by several measures of well-being, the

positive correlations were not that strong, so the impact of these correlations should be interpreted with caution. However, it should be pointed out that the findings of this study show that the two groups scored in a similar manner which contradict theories about that Chinese people would rather experience higher well-being when being motivated by extrinsic motivation than intrinsic motivation (Markus & Kitayama, 2003; Hau & Ho, 2010; Joshanloo, 2013).

In relation to the fourth hypothesis, it was expected that the Chinese and the Swedish samples might show a different pattern of responding on the two measures of affective well-being. Specifically, it was predicted that positive affect (PA) of the Chinese sample as measured by the PANAS would be lower than the scores of the Swedish sample, and that peace of mind of the Chinese sample as measured by POMS would be higher than the scores of the Swedish sample. When analysing the participants´ subjective well-being (SWB) by the two common western instruments PANAS and SWLS the following results were found. First, the Swedish sample reported a significantly higher score of life satisfaction than the Chinese sample. Second, the Swedish sample reported a higher score of PA compared to the Chinese sample although this difference was not significant. Additionally, the Swedish sample reported a significantly lower score of NA in comparison to the Chinese sample. Taken together, it appears like the Swedish sample have higher SWB than the Chinese participants. However, when affective well-being was measured by the alternative instrument POMS which is developed to target the Chinese perspective of well-being the Chinese sample showed a very similar score to the Swedish sample. In fact, the Chinese sample actually showed a slightly higher score, although not significant. These results are in line with the claims that Chinese people value peace of mind differently in comparison to the common way of measuring well-being as SWB (Y. Lee et al., 2012; Markus & Kitayama, 1991; Lu & Gilmour, 2004; Tsai et al., 2006; Delle Fave et al., 2016). As previously

mentioned, Delle Fave et al. (2016) have reported that the most frequent definition of "happiness" for lay people in 12 nations is low arousal positive affect such as "harmony" "balance" and "inner peace" rather than high arousal positive affect. Could it be that the hypothesized Chinese strive for low arousal positive affect actually is not a "Chinese concept" but a more universal concept? The World Health Organization (WHO, 2013) have established the Mental Health Action Plan 2013-2020 with the goal to promote mental well-being and prevent mental disorders across the globe. In order to meet this goal WHO (2013) have expressed that a valid operational definition of well-being is needed that holds universally if that is possible. It might be worth to take under consideration when researchers, organizations and policymakers want to measure well-being universally that the construct of SWB is not covering the full spectrum of positive affect as several articles been demonstrating (Lu & Gilmour, 2004; Tsai et al., 2006; Y. Lee et al., 2012) and furthermore this present study is strengthening.

A limitation of the present study is that all of the Chinese participants were recruited in Shanghai which make the findings hard to generalize to all university students of China. Likewise, all the Swedish participants were recruited in Skövde which make the findings from this sample hard to generalize to all university students of Sweden. Moreover, this study had a correlational design and therefor no conclusions regarding cause and effect can be made. Another limitation of the present study is that it regards university students only, which make the generalizability to Swedish and Chinese general population impossible. Therefore, a similar study of a broader sample of the general populations would be needed. Additionally, the samples were fairly small and would need further investigations in a bigger scale in order to draw further conclusions.

The topic of well-being is an interesting new field in cognitive neuroscience (Kringelbach & Berridge, 2009). So far there have not been conducted so many studies,

which was another limitation for this thesis. Although constructs of well-being such as eudaimonic well-being have been examined, the majority of research of the neural correlates of well-being has examined the "western" perspective of well-being; SWB (Rickard & Vella-Brodrick, 2013). So far, researchers have not come to coherent conclusions of the neural correlates of cognitive or affective SWB. However, it has been widely accepted to measure well-being as equal to SWB in various cultures, including China (Kong et al., 2015).

However, it has been argued from previous research and also from this field study that people from the Chinese culture, and other cultures as well as pointed out by Delle Fave et al. (2016), value peace of mind as an important predictor of well-being. As far as the author knows, no neuroscientific study has so far been measuring well-being as "peace of mind" using POMS. Hence, it should be considered to study the neurobiology in comparison of a scale like the POMS additionally to scales like PANAS and SWLS. Whether LAP affect such as peace of mind would activate other brain regions that HAP affect is difficult to say. However, one could hypothesise that the participants of a neuroscientific study define well-being differently, with some people striving for LAP affect such as "peace of mind" and "harmony" and on the opposite, some people striving for HAP affect such as "enthusiastic" and "excited". The researchers would do a resting state fMRI study to examine the spontaneous neural activity in the brains of people with extraordinary high well-being. In order to select this group, all the participants would report their SWB by SWLS and PANAS and the participants with the 50 % highest scores of these scales would be labelled the high well-being group. In this case, it is possible that the participants who might actually strive for peace of mind would get a lower score of SWB and therefore be selected to the control group although they experience high well-being from their point of view. Hence, it is questionable if the neural correlates provide a meaningful result.

Furthermore, cultural neuroscience has been showing that a group of Chinese

participants and a group of "western" participants had differences in functional neurobiology when examining self-representation (Zhu et al., 2007). Since Chinese and Swedish people have showed significant differences in how they report their well-being, it might be of interest to look further into functional neurobiology of different concepts of well-being in participants with cultural backgrounds.

On the opposite, cultural neuroscientific research of cultural differences of intrinsic and extrinsic motivation does not seem to have any relevance as the reviewed literature in this thesis in addition to the results of this present study strengthen. However, since intrinsic motivation have been repeatedly correlated to well-being, more cognitive neuroscientific research on intrinsic motivation should be conducted. A limitation of this thesis was the lack of studies that have been published so far. As concluded in the literature review, the few studies of intrinsic motivation have shown mixed results and, in some cases, contradicting results. W. Lee et al. (2012) found that their participants had a higher insular activation in while their participants which chose to act for an intrinsic reason. Meanwhile, Marsden et al. (2014) found that participants who experienced intrinsic motivation to solve a fun word puzzle had lower insular activation. The author of this thesis suggest that the differences could be due to different methodology. The participants of Marsden et al. (2014) were engaging in the fun puzzle while their insula was deactivated. On the other hand, the participants of W. Lee et al. (2012) imagined if it would be fun to do an interesting project in the future while their insula was activated. Hence, the latter participants were not performing within the state of intrinsic motivation in the moment as the former were. According to Csikszentmihalyi (2008), intrinsic motivation is closely related to *flow* which provides feelings of effortless control and losing the sense of time and interoception during total concentration. Insular cortex has been associated with feelings of pleasure generated by bodily sensations (Goldstein et al., 2009) and might hence be deactivated while a person is in

flow. The author of this thesis suggests that the participants of Marsden et al. (2014) might have been in flow during the fun task and therefore had lower insula activation while the participants of W. Lee et al. (2012) were experiencing enjoyment and interest when they thought about engaging in a fun project in the future. Future research on intrinsic motivation should try to distinguish the neural correlates of being intrinsically motivated in the moment and the cognitive perception of something that feels intrinsically motivating and report the separations in order to avoid confusion.

Studies of the undermining effect have shown that extrinsic rewards such as money or grades can diminish the intrinsic motivation to participate in a task by behaviour and neuroscientific studies. The author of this thesis suggests that since intrinsic motivation repeatedly has been correlated with higher well-being, policymakers should look into how intrinsic motivation can be enhanced and the most heteronomous forms of extrinsic motivations avoided. This regards occupational, educational and therapeutic settings.

To conclude, the results of this present study found that intrinsic motivation is correlated to well-being for both the Swedish and the Chinese participants. Furthermore, the Swedish students experienced higher well-being compared to the Chinese students when measured by the traditional "western" instruments. However, the Swedish and the Chinese students reported very similar peace of mind on the recently developed alternative scale. This confirms research indicating that people from different cultures have different perspectives of what well-being is and score diverse instruments differently. Hence, it should be considered to use different concepts and instruments in distinctive cultures in order to measure well-being accurately in future research.

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8. Appendix

8.1 AMS-C

Why do you go to university?
您为什么上大学？

For each statement, mark the numbers 1-7 that fits best for the corresponding meaning.
下列选项中，用数字 1 至 7 标出最符合的意图。
1= Does not correspond at all
根本不符合
2= Corresponds very little
符合一点
3= Corresponds a little
符合一部分
4= Corresponds moderately
适度符合
5= Corresponds well
很符合
6= Corresponds very well
非常符合
7= Corresponds exactly
完全符合

Because with only a high-school qualification I would not find a high-paying job later on. 因为只持有高中学历我不能在以后找到一份高薪酬工作。	1	2	3	4	5	6	7
Because I experience pleasure and satisfaction while learning new things. 因为我在学习新东西时感到愉快和满意。	1	2	3	4	5	6	7
Because I think that a university education will help me better prepare for the career I have chosen. 因为我认为大学教育会帮我更好的为我选择的职业生涯做准 备。	1	2	3	4	5	6	7
For the intense feelings I experience when I am communicating my own ideas to others. 为了追求我和他人交流自己想法时经历的强烈感觉。	1	2	3	4	5	6	7
Honestly, I don´t know; I really feel that I am wasting my time in university. 诚实的说，我不知道；我真的觉得在大学是浪费我的时间。	1	2	3	4	5	6	7
For the pleasure I experience while surpassing myself in my studies. 为了在学习中使自己变卓越而感到高兴。	1	2	3	4	5	6	7

To prove to myself that I am capable of completing my university degree 为了证明我有能力完成大学学位。	1	2	3	4	5	6	7
In order to obtain a more prestigious job later on. 为了在以后获得一个更受尊敬的工作。	1	2	3	4	5	6	7
For the pleasure that I experience when I discover new things never seen before. 为了经历探索以前从未看到的事物时的愉悦。	1	2	3	4	5	6	7
Because eventually it will enable me to enter the job market in a field that I like. 因为最终它能允许我进入我喜欢的领域的工作市场。	1	2	3	4	5	6	7
For the pleasure that I experience when I read interesting authors. 为了阅读有趣的作者时经历的快乐。	1	2	3	4	5	6	7
I once had good reasons for going to university; however, now I wonder whether I should continue. 我曾有很好的上大学的理由，然而，现在我怀疑我是否应该继续。	1	2	3	4	5	6	7
For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments. 为了我的某项个人成就中超越自己时经历的快乐。	1	2	3	4	5	6	7
Because of the fact that when I succeed in university I feel important. 因为我在大学取得成功的事实使我感到重要。	1	2	3	4	5	6	7
Because I want to have “the good life” later on. 因为我想在以后拥有“好的生活”	1	2	3	4	5	6	7
For the pleasure that I experience in broadening my knowledge about subjects which appeal to me. 为了追求拓展吸引我的学科的知识时经历的快乐。	1	2	3	4	5	6	7
Because this will help me make a better choice regarding my career orientation. 因为这会帮助我定位一个更好的关于职业目标。	1	2	3	4	5	6	7
For the pleasure that I experience when I feel completely absorbed by what certain authors have written 未来感到被特定的作者作写的东西完全吸引时经历的快乐。	1	2	3	4	5	6	7
I can´t see why I go to university and frankly, I couldn´t care less. 我不明白我为什么上大学，坦率的说， 我一点也不关心。	1	2	3	4	5	6	7
For the satisfaction I feel when I am in the process of accomplishing difficult academic activities. 为了在完成困难学术活动的过程中感到的满足。	1	2	3	4	5	6	7
To show myself that I am an intelligent person. 为了向我自己证明我是一个聪明的人。	1	2	3	4	5	6	7

In order to have a better salary later on. 为了在以后获得更好的薪水。	1	2	3	4	5	6	7
Because my studies allow me to continue to learn about many things that interest me. 因为我的学业允许我继续学使我感兴趣的东西。	1	2	3	4	5	6	7
Because I believe that a few additional years of education will improve my competence as a worker. 因为我相信几年额外的教育会提高我作为工作者的能力。	1	2	3	4	5	6	7
For the “high” feeling that I experience while reading about various interesting subjects. 为了在阅读不同种类兴趣的学科时经历的很爽的感觉。	1	2	3	4	5	6	7
I don´t know; I can´t understand what I am doing in university. 我不知道；我不明白我在大学在做什么。	1	2	3	4	5	6	7
Because university allows me to experience a personal satisfaction in my quest for excellence in my studies. 因为大学允许我在追求我学习的卓越中经历个人满意感。	1	2	3	4	5	6	7
Because I want to show myself that I can succeed in my studies. 因为我想向自己证明我可以在学习中成功。	1	2	3	4	5	6	7

8.2 PANAS

Below are a few words that describe different emotions. Read each word and mark how you felt during the past week. Mark the number 1-5 that best suits you.
下面是一些描述不同情绪的单词。读每一个单词并标出您在上个星期的感觉，用数字1—5标出最符合您的选项。

1= Very slightly or not at all
很少一点或者根本不
2= A little
一点点
3= Moderately
适度的
4= Quite a bit
相当多
5= Extremely
特别多

1. Interested 有趣的	1	2	3	4	5
2. Distressed 苦恼的	1	2	3	4	5
3. Excited 激动的	1	2	3	4	5

4. Upset 不安的	1	2	3	4	5
5. Strong 强大的	1	2	3	4	5
6. Guilty 内疚的	1	2	3	4	5
7. Scared 害怕的	1	2	3	4	5
8. Hostile 怀有敌意的	1	2	3	4	5
9. Enthusiastic 热情的	1	2	3	4	5
10. Proud 骄傲的	1	2	3	4	5
11. Irritable 急躁的	1	2	3	4	5
12. Alert 警惕的	1	2	3	4	5
13. Ashamed 惭愧的	1	2	3	4	5
14. Inspired 有雄心壮志的	1	2	3	4	5
15. Nervous 紧张的	1	2	3	4	5
16. Determined 坚定的	1	2	3	4	5
17. Attentive 聚精会神的	1	2	3	4	5
18. Jittery 紧张不安的	1	2	3	4	5
19. Active 活跃的	1	2	3	4	5
20. Afraid 担心的	1	2	3	4	5

8.3 SWLS

Below are five statements. For each statement, indicate to what extent you agree or disagree. To do this, enter the appropriate number from scale 1-7 that best fits with what you think.

下面是五个选项，每个选项中，表明您同意或者不同意的程度。为了做这件事，从级别 1-7 选择合适的符合您所考虑的数字。

1= Strongly Disagree
强烈不同意
2= Disagree
不同意
3= Slightly Disagree
略微不同意

4= Neither Agree nor Disagree
既不同意也不不同意
5= Slightly Agree
略微同意
6= Agree
同意
7= Strongly Agree
强烈同意

1. In most ways my life is close to my ideal. 多数情况下我的生活与我的理想很接近。	1	2	3	4	5	6	7
2. The conditions of my life are excellent. 我的生活条件是卓越的。	1	2	3	4	5	6	7
3. I am satisfied with my life. 我对我的生活很满意。	1	2	3	4	5	6	7
4. So far I have gotten the important things I want in life. 到目前为止我已经获得我生命中想要的重要的东西。	1	2	3	4	5	6	7
5. If I could live my life over, I would change almost nothing. 如果我能重新过我的生活，我几乎什么都不会改变。	1	2	3	4	5	6	7

8.4 POMS

How often do you feel internal peace and ease in your daily life? Use the following scale 1-5 to indicate your response. Make a mark on the most suitable number.
您对日常生活中内在的平静和安逸有什么感觉？使用下列级别1-5表明您的回答。在最合适的数字上做出标记。

1= Not at all
根本不
2= Some of the time
有时
3= Often
经常
4= Most of the time
大多数时间
5= All of the time
所有时候

1. My mind is free and at ease. 我的大脑是自由和平静的。	1	2	3	4	5

2. I feel content and comfortable with myself in daily life. 我日常生活中自我感觉满意和舒适。	1	2	3	4	5
3. My lifestyle gives me feelings of peace and stability. 我的生活风格带给我平静感和稳定感。	1	2	3	4	5
4. I have peace and harmony in my mind. 我大脑中感到平静和和谐。	1	2	3	4	5
5. It is difficult for me to feel settled. 感到稳定对我来说是困难的。	1	2	3	4	5
6. The way I live brings me feelings of peace and comfort. 我生活的方式带给我平静感和舒适感。	1	2	3	4	5
7. I feel anxious and uneasy in my mind. 我大脑中感到焦虑和不安。	1	2	3	4	5